

Risk Factors for Firearm Injuries: From K.H.I.E.S.

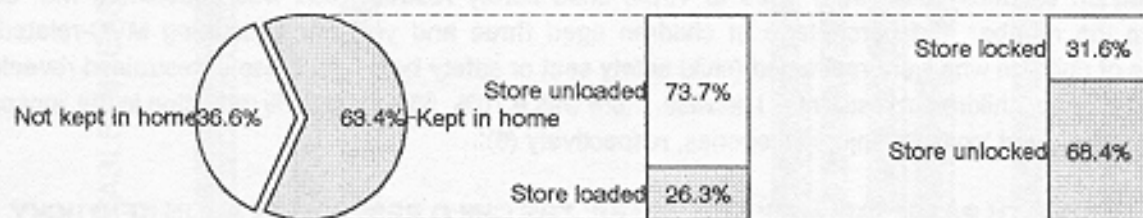
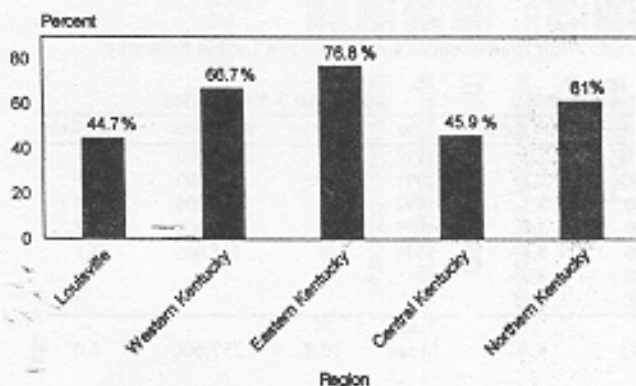
State and national injury-control priorities include reducing intentional, unintentional, and self-inflicted firearm injuries. Surveillance for weapon-related injuries - the systematic collection of data about both fatal and non-fatal injuries - is essential to develop a scientific approach to preventing these injuries.

Surveillance can assist in efforts to provide public education, develop legislation to reduce risks for weapon-related injuries, identify groups and communities at highest risk for such injuries, and evaluate prevention initiatives.¹ Data from the Kentucky Health Interview and Examination Survey can assist in establishing a baseline for surveillance in Kentucky.

In the confidential component of the interview, respondents were asked questions about guns kept in the home. Firearms were kept in the homes of 63.4% of the respondents, 26.3% were stored while loaded, and 68.4% were stored in an unlocked place when not in use.

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Figure 1. Firearm Ownership and Storage, KHIES, 1993**Figure 2. Percentages of Homes With Guns, By Region, KHIES, 1993**

Percentages of homes with guns varies by region of the state. The Eastern Kentucky Region had the highest percentage of homes with guns (76.8%).

The Kentucky Injury Prevention and Research Center is committed to further study of the firearm/injury problem and to work with other community partners to recommend ways of reducing such injuries.

Reference:

Centers for Disease Control. Emergency department surveillance for weapon-related injuries - Massachusetts. MMWR 44(9):160-69. 1993.

Kentucky's Child Restraint Law has Saved Lives: A Review of the Past 20 Years

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INTRODUCTION

For many years, the leading cause of death and disability among Kentucky children aged 0-4 has been as occupants in motor vehicle crashes (MVCs). In an effort to reduce the number of children killed or injured in MVCs, Kentucky amended a law (KRS 189.125) in 1982 requiring that, "any parent or legal guardian of a child, forty inches (40") in height or less, when transporting his child...shall have such child properly secured in a child restraint system of a type meeting federal motor vehicle safety standards" (1). In a 1985 report (2), MV occupant death rates for Kentucky children aged 0-4 were examined from 1970 through 1984, which included years 'before' and 'after' enactment of the child restraint law. The present report provides a comprehensive summary of MVC-related childhood fatalities over the past 20 years by reviewing data from 1975 through 1984, and by presenting new statistics for 1985 through 1994. We describe the trends in MV occupant death rates over time; examine the long term effects of the restraint law; and discuss factors that influence MVC-related mortality rates among children aged 0-4 in Kentucky.

CHILD RESTRAINT USE AND INJURY REDUCTION

The first mandatory child restraint law was implemented in Tennessee in 1978. Other states shortly followed suit, and by 1985 all 50 states and the District of Columbia had enacted similar child restraint laws (3). Between 1978 and 1983, child restraint use in Tennessee rose from 8% to more than 30%, and the number of deaths among children younger than four years of age declined by more than 50% (4). In Michigan, the use of safety seats among children aged 0-4 increased from 12% to 51% and the number of injuries to the head and extremities declined 20-25% (5). National averages indicate that the proper use of child safety seats can reduce fatalities by 71% and hospitalizations by 67% (3).

Based on Kentucky data from 1990 to 1994, child safety restraint use was associated with substantial reductions in the number and percentage of children aged three and younger sustaining MVC-related injuries. Comparisons of children who were restrained (child safety seat or safety belt) with those unrestrained revealed a 50% decline in fatalities for children in restraints. Likewise, there was a 70%, 58%, and 42% reduction in the 'incapacitating', 'non-incapacitating', and 'possible' injury categories, respectively (6).

MV OCCUPANT DEATH RATES 'BEFORE' AND 'AFTER' THE CHILD RESTRAINT LAW IN KENTUCKY

During the 12-year period (1970-1981) prior to the passage of the child restraint law in Kentucky, 203 children aged 0-4 died as MV occupants (2). In 1981, the death rate was 8.1 per 100,000 children aged 0-4. In 1983, after passage of the amendment, the MV occupant death rate among children 0-4 was 5.0 per 100,000. By 1984, the death rate was as low as 2.2 per 100,000 (Table 1). This represents a 73% reduction in death rate, and an estimated 17 young lives saved.

Table 1: Motor Vehicle Crash-Related Fatalities to Passengers Aged 0-4 Before and After Enactment of Child Restraint Law in Kentucky

7-Year Period Prior to Amendment				7-Year Period Following Amendment				Past 5-Year Period			
Year	Fatalities*	Population*	Death Rate	Year	Fatalities	Population	Death Rate	Year	Fatalities	Population	Death Rate
1975	21	276,000	7.6	1983	14	281,000	5.0	1990	9	255,000	3.5
1976	13	271,000	4.8	1984	6	277,000	2.2	1991	18	254,000	7.1
1977	18	272,000	6.6	1985	10	271,000	3.7	1992	5	258,000	1.9
1978	16	276,000	5.8	1986	10	264,000	3.8	1993	11	260,000	4.2
1979	11	281,000	3.9	1987	14	258,000	5.4	1994	8	261,000	3.1
1980	16	283,000	5.7	1988	11	253,000	4.3				
1981	23	285,000	8.1	1989	10	252,000	4.0				
Total	118	--	--	Total	75	--	--	Total	51	--	--
Mean	16.9	277,714	6.1	Mean	10.7	265,143	4.1	Mean	10.2	257,600	4.0

*Data from Kentucky Dept. for Health Services, Vital Statistics.

*Population estimates from University of Louisville, Urban Studies Institute.

On average, the number of deaths to MV occupants aged 0-4 between 1975 to 1981 was 16.9; the average death rate was 6.1 per 100,000 (0-4 year-olds). From 1983 to 1989, the average number of deaths was 10.7; the average death rate was 4.1 per 100,000. Comparison of the 7-year 'before' (1975-1981) period with the 7-year 'after' (1983-1989) period revealed a 37% and 33% reduction in the average number of deaths and death rate (respectively) among children aged 0-4 as MV occupants. Statistics from 1990 to 1994 were virtually unchanged from the 1983 to 1989 values. The average number of deaths was 10.2; the average death rate was 4.0 (Table 1).

In Table 2, the observed deaths for each year following enactment of the child restraint law were compared with the expected number of deaths based on the average death rate prior to passage of the restraint law (1975-1981). The probability that the observed number of deaths occurred by chance given the expected number of deaths was calculated by using a chi-square test ($p < 0.002$). The results indicate significant reductions in the number of deaths to MV occupants aged 0-4 after enactment of the child restraint law in Kentucky.

Table 2. Motor Vehicle Crash Fatalities to Occupants Aged 0-4: Observed vs. Expected Deaths, 1982-1994

Year	Observed Deaths	Expected Deaths*	O/E Ratio†
1982	16	17.3	0.92
1983	14	17.1	0.82
1984	6	16.9	0.36
1985	10	16.5	0.61
1986	10	16.1	0.62
1987	14	15.7	0.89
1988	11	15.4	0.71
1989	10	15.4	0.65
1990	9	15.6	0.58
1991	18	15.5	1.16
1992	5	15.7	0.32
1993	11	15.9	0.69
1994	8	15.9	0.50
1982 - 94	142	209.0	0.68

*Average death rate for 1975-81 X population aged 0-4.
†Ratio of observed deaths to expected deaths.

TRENDS IN MV OCCUPANT DEATH RATES DURING THE PAST 20 YEARS

To examine trends in the MV occupant death rate of 0-4 year-olds over time, the data in Table 1 have been put into graphic format (Figure 1). Dramatic fluctuations in death rate (filled boxes) are apparent, and a number of influential factors could contribute to these changes. For example, what might account for the decrease in MV occupant death rate that occurred between 1975 and 1979? Given Tennessee's geographic proximity to Kentucky, the publicity surrounding Tennessee's law in 1978 may have launched an increase in safety seat use in Kentucky, leading to a subsequent decline in MV occupant death rate among 0-4 year-olds. Unfortunately, data on the use of child restraints prior to 1982 were not available. The decline in MV occupant death rate among young children aged 0-4 was transient, however; between 1979 and 1981 there was an equally dramatic increase in death rate. Without information on use rates, it is difficult to determine what may have been responsible for the rise in death rate (but see below).

As predicted, the death rate for MV occupants aged 0-4 declined precipitously after amendment of the Kentucky statute in 1982. An observational survey conducted prior to enactment of the law (May and June 1982) reported a statewide child safety seat usage rate (Figure 1, open circles) of 14.4% (7). An identical survey performed after the law became effective (May through August 1983) reported a usage rate of 22.7% (8). Although usage rates leveled off between 1984 and 1986, a steady increase has been reported since 1988. (An observational survey was not performed in 1987). In 1994, a statewide child restraint usage rate of 72% was reported (9). If usage rates continue to increase, the state will meet the 'Healthy Kentuckians 2000' objective to increase the use of child restraint systems among children aged 0-4 to at least 75% (10).

Figure 1: Motor Vehicle Crash Fatalities vs. Restraint Usage
Passengers Aged 0-4



POSSIBLE FACTORS THAT INFLUENCE CHILDHOOD MVC-RELATED FATALITY RATES

That the use of restraint systems is effective in reducing the number of deaths and injuries from MVCs is well documented. It is also apparent that legislative efforts increase restraint usage. Nevertheless, there are additional factors that can affect usage rates, and events subsequent to the child restraint law in Kentucky may have impacted MV occupant death rates among children aged 0-4. For example, in 1988 the state introduced a penalty (\$50 fine) for violation of the restraint law (9). To the extent that this sanction was enforced, the penalty may have contributed to the observed increase in usage. While information on the number of citations for such violations was not available, there was a small decline in MV occupant death rate between 1988 and 1989 (Figure 1).

In 1990, Lexington enacted a local ordinance mandating the use of seat belts for adults; the city of Louisville passed a similar ordinance in 1991. By 1994, all city and county ordinances were replaced by a statewide safety belt law (9). During this time, there was a steady increase in safety seat usage for children under 4 years of age from 57% in 1990, to 72% in 1994 (9). The societal impact of these legislative actions on related safety issues should not be underestimated. For example, adult and child occupant restraint use is higher in states with a mandatory safety belt law than it is in states without such a law (11).

We intended to examine the relationship between statewide highway safety campaigns and childhood MV occupant death rate during this 20-year period. The information we received was sparse, and obtained from a verbal history (Kentucky State Police, personal communication) rather than from official records. Other historically relevant events (e.g., bus crashes, multiple-vehicle/fatality crashes) may affect the number of fatalities (e.g., 18 children killed in 1991; Table 2) and hence, MV occupant death rate during a given year.

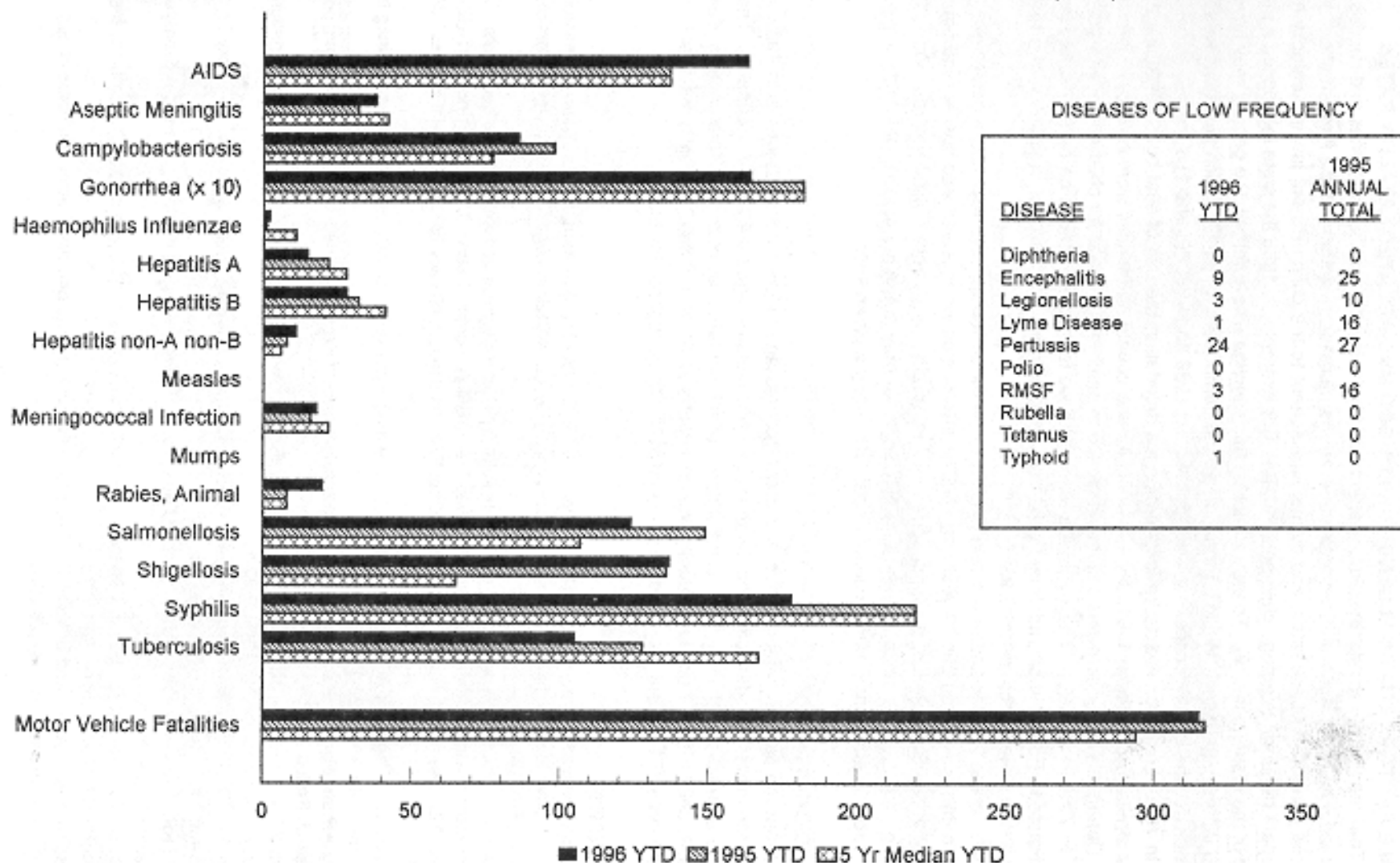
CONCLUSION

From the data presented above, it is clear that passage of the child restraint law in 1982 contributed, at least in part, to the dramatic reduction in the death rate among children aged 0-4 as MV occupants. The data also suggest an inverse correlation between child restraint use and fatality rates: as restraint use increases, death rates decrease. As of 1994, child restraint use in Kentucky was as high as 72%. At this rate, the child restraint law has contributed to saving the lives of 102 Kentucky children involved in MVCs throughout the state.

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CASES OF SELECTED REPORTABLE DISEASES IN KENTUCKY, YEAR TO DATE (YTD) THROUGH MAY 1996



Disease numbers reflect only those cases which meet the surveillance definition.

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Alert . . . Rocky Mountain spotted fever

Reporting of Rocky Mountain spotted fever has begun for 1996 earlier in the season than in most years. It is not known whether this will presage an increase in the annual incidence, but it serves as a reminder to be alert for the possibility of this potentially fatal illness, which generally responds well to appropriate early treatment.

Heat-Related Illness

Knowing signs and symptoms of common heat-related illnesses allows treatment to be started early.

Anyone can develop a heat-related illness although the following groups of people are at higher risk: the elderly, obese, infants and toddlers, active young people, substance abusers, and those on certain medications which include diuretics, laxatives, beta blockers, phenothiazines, tricyclic antidepressants and cholinergic blocking agents.

HEAT SYNCOPE
lightheadedness
profuse perspiration
fainting

Move to closest cool spot.
Stretch out with feet up.
Drink water or juice.
(nothing with caffeine)
Rest.

HEAT CRAMPS
extremely painful
cramps especially in the
large muscles of the
calf, thigh, abdomen, or
shoulder

Rest in a cool
environment. If not
nauseated, drink
electrolyte solution or
1/4 tsp. salt in 1 qt.
water.

HEAT EXHAUSTION
muscle cramps; cool,
clammy or dry skin, nausea,
slight confusion, flu-like
symptoms, rapid heart rate,
loss of muscle coordination.

Remove clothing. Dampen
skin. Fan the person. Put
ice packs on scalp, in axilla
and groin. Monitor
temperature to be sure it
does not go below 100° F.
Drink electrolyte solution.

HEAT STROKE (symptoms can progress
over hours or days). Core temperature over
104° F.; more pronounced symptoms of heat
exhaustion confusion, seizures, psychotic
behavior or unresponsiveness, hot, dry skin
which is either pink or ashen (although some
continue to perspire profusely), heart rate
up to 180 beats per minute, respirations up
to 50-60 per minute.

Maintain airway, breathing, circulation.
Lower core temperature rapidly to 100° F.
Transport to hospital. Keep skin wet and
fan it.